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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,215	10/30/2003	Xiaohui Hao	137954 (15114US01)	9776
23446 7590 07/23/2009 MCANDREWS HELD & MALLOY, LTD 500 WEST MADISON STREET SUITE 3400 CHICAGO, IL 60661				
EXAMINER CATTUNGA, SANJAY				
ART UNIT 3768		PAPER NUMBER		
MAIL DATE 07/23/2009		DELIVERY MODE PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/697,215

Applicant(s)

HAO ET AL.

Examiner

SANJAY CATTUNGAL

Art Unit

3768

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4-9, 11-14 and 17-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4-9, 11-14 and 17-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Response to Arguments

Applicant's arguments with respect to claims 1, 4-9, 11-14, and 17-23 have been considered but are not persuasive.

Applicant's arguments, regarding Golay codes being transmitted on a single transmission, is not supported by the specifications. Paragraph 37 of the specification teaches "transmitting code "A" on odd lines and code "B" on even lines" further it states that "each ultrasound scan line is formed using a single transmission". Furthermore Fig. 4 of the application which clearly shows the invention, is a flowchart which shows: transmit a first code on a first line, receive echoes, match filter and store receive echoes; transmit second code on a second line, receive echoes, match filter and store receive echoes; since the first code is transmitted and received and then the second code sent, which has to be sent on different transmissions. As such the newly filed amendment is considered new matter.

All of applicants arguments are based on the newly filed claim limitation "Golay codes being transmitted on a single transmission" and based on its definition ("transmitting code "A" on odd lines and code "B" on even lines" and "each ultrasound scan line is formed using a single transmission") as found in paragraph 0037 of the specifications, the Kawagishi and Napolitano references teach sending two Golay codes in two single transmissions. As such the rejection is maintained.

Furthermore Examiner has cited a new reference U. S. Patent No. 7,066,886 to Song et al. Which teaches two Golay codes being sent in a single transmission (Fig. 6 and Col. 11 lines 1-3).

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 1, 9, and 14, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention "in a single transmission, transmitting said first ultrasound beam on a first path and transmitting second ultrasound beam on a second path" these limitations do not have support in the specification and are considered new matter.
2. Claims 1, 9, and 14, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Paragraph 37 of the specification teaches "transmitting code "A" on odd lines and code "B" on even lines" further it states that "each ultrasound scan line is formed using a single transmission". Furthermore Fig. 4 of the application which clearly shows the invention, is a flowchart which shows: transmit a first code on a first line, receive echoes, match filter and store receive echoes; transmit second code on a second line, receive echoes, match filter and store receive echoes; since the first code is transmitted and received and then the second code sent, which has to be sent on a different

transmission. The newly filed amendment requires both codes to be sent on a single transmission which cannot be carried out as such the claims are rejected for lack of enablement.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 7, 9, 11, 14 are rejected under 35 U.S.C. 103(a) as being obvious over U. S. Patent No. 6,663,565 to Kawagishi et al. in view of U. S. Patent No.6,193,663 to Napolitano et al further in view of U. S. Patent No. 7,066,886 to Song et al.

.Re Claim 1: Kawagishi discloses a coded excitation of ultrasound beams, encoding a first ultrasound beam (here one of the two sequences of pulses in disclosed reference) with a first code, transmitting first ultrasound beam on a first path (path that used for transmitting the pulses) encoding a second ultrasound beam (here the second sequences of pulses which is disclosed in reference) with a second code transmitting second ultrasound beam on a second path and receiving echo signals (received signal according to the reference) from first and second ultrasound beams, wherein first and second codes are Golay codes (Claims 1, 2, 12, and 13).

Kawagishi does not expressly teach that the first and second transmit path are spatially adjacent to each other and the first and second code are transmitted using a single transmission.

Napolitano teaches that in multi-line imaging the first and second transmit path are spatially adjacent to each other. (Fig. 11 and Col. 4 lines 17-30)

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Kawagishi such that the first and second transmit path are spatially adjacent to each other as taught by Napolitano, since such a setup would result in more efficient use of transmit cycles and hence more efficient imaging.

Kawagishi and Napolitano teach all of the above claimed limitations but do not expressly teach that the first and second code are transmitted using a single transmission.

Song teaches two Golay codes being sent in a single transmission (Fig. 6 and Col. 11 lines 1-3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kawagishi and Napolitano such that two Golay codes are sent in a single transmission as taught by Song, since such a setup would result in more improving resolution without sacrificing frame rate.

Claims 4, 8, 12, and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawagishi, Napolitano and Song in view of Philips (US patent 6,213,947).

Re Claims 4, 8, 12, and 17-19: The teachings of Kawagishi, Napolitano and Song have been discussed above.

However, Kawagishi, Napolitano and Song, fail to disclose or fairly suggest use of matched filtering on the echo signals, Philips teaches the use of match filtering for most of the discussions related to both tissue harmonic imaging and contrast agent imaging within the art (See col.26 line 17-25).

Therefore, in view of Philips, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the match filter with the filter of Kawagishi, Napolitano and Song. Match filter could be used on echo signals in contrast agent imaging to have concentration on preferred embodiments of the received harmonic pulse(s) and further to apply the lateral filtering for averaging between the first and second transmit focal zone, in order to significantly reduce the signal to noise ration of a beam in an ultrasound imaging method.

Claims 5, 6, 13 and 20-23, are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawagishi, Napolitano, Song and Phillips in view of U. S. Patent No. 5,984,869 to Chiao

Regarding Claims 5, 6, 13, and 20-23, Kawagishi, Napolitano, Song and Phillips teach all of the above claimed limitations but do not expressly teach the use of FIR filters.

Chiao '869 teaches a method wherein finite impulse response (FIR) was applied for filtering (See Col.5 line 31-36), therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the method of

averaging the echo signals and higher order finite impulse response (FIR), by lateral filtering, in order to improve the method and apparatus of ultrasounds imagining wherein the signal to noise ration (SNR) is reduced.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **SANJAY CATTUNGAL** whose telephone number is (571)272-1306. The examiner can normally be reached on Monday-Friday 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SPC

/Long V Le/
Supervisory Patent Examiner, Art Unit 3768